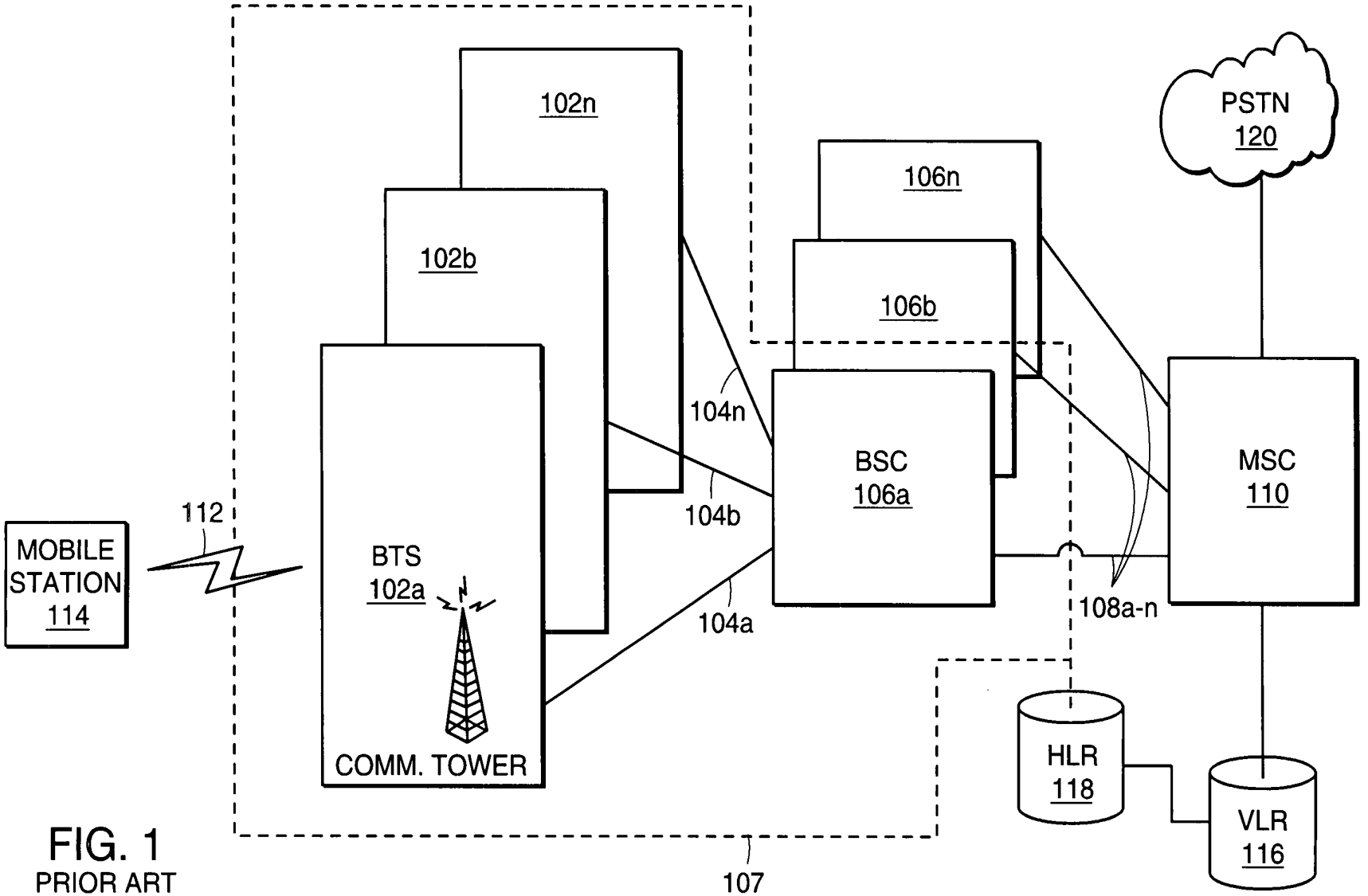

FIG. 1
PRIOR ART

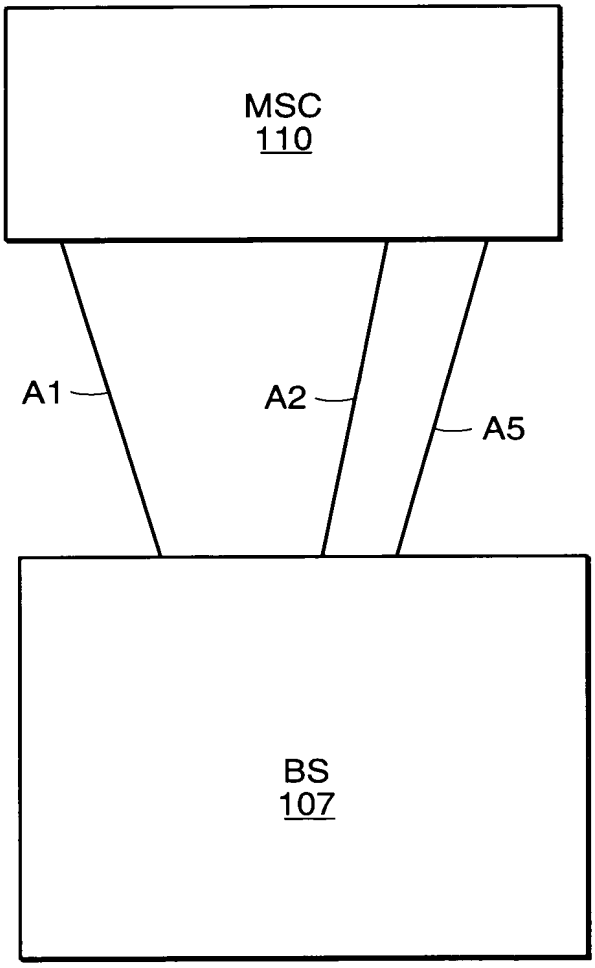

FIG. 2
PRIOR ART

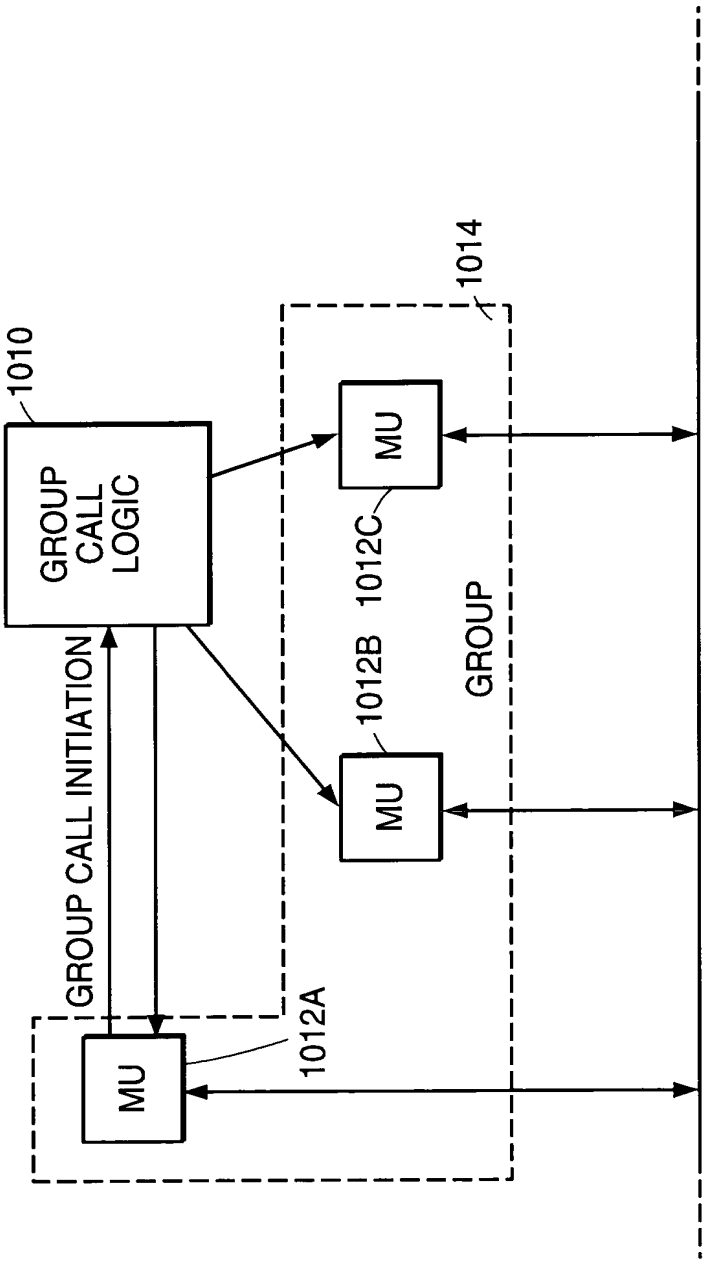
1010
GROUP CALL LOGIC
GROUP CALL INITIATION
1014
GROUP
MU
1012A
1012B
MU
1012C
MU
MULTICAST IP NETWORK

FIG. 3

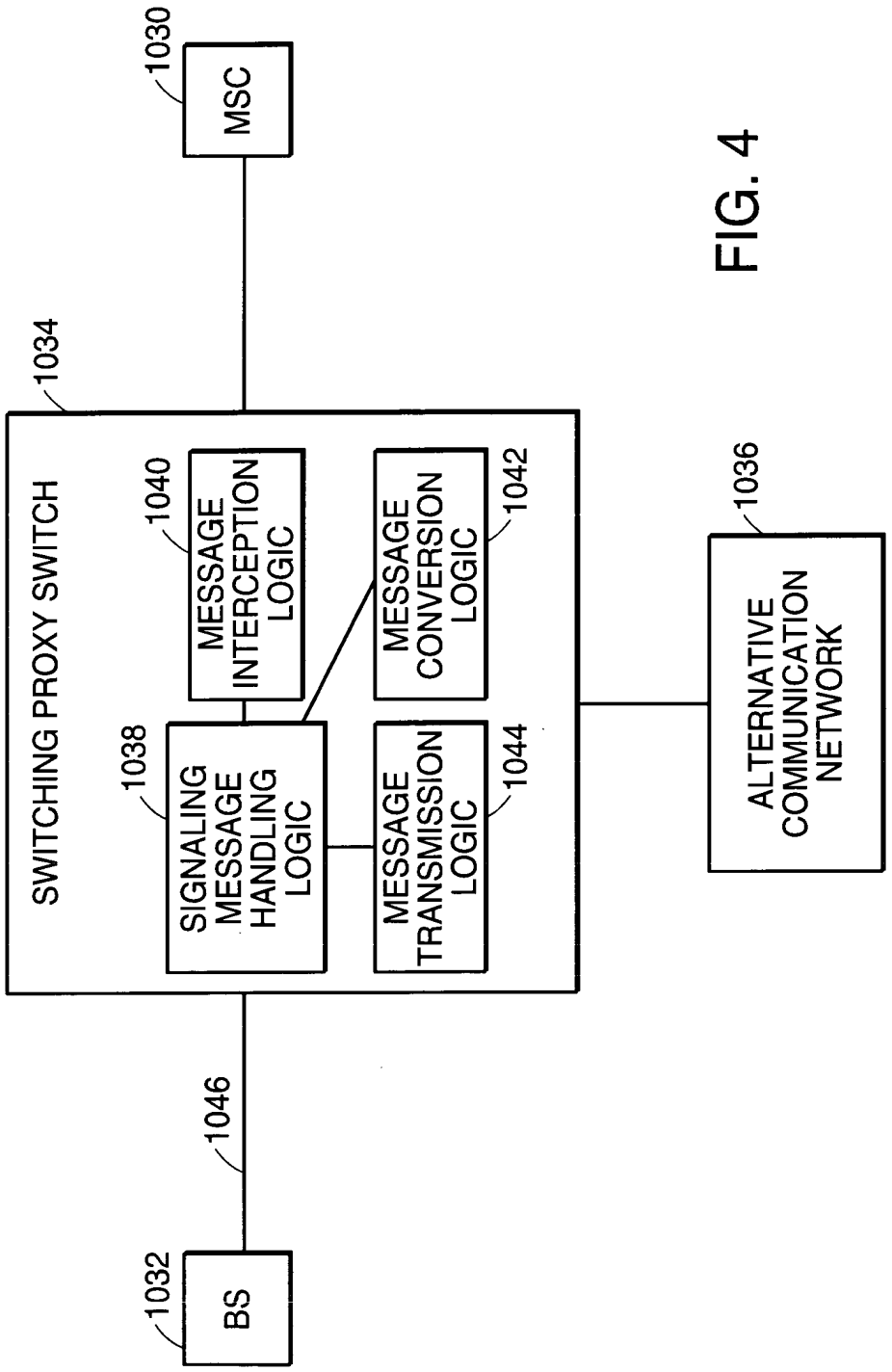
1030
MSC
1034
SWITCHING PROXY SWITCH
1040
MESSAGE INTERCEPTION LOGIC
1042
MESSAGE CONVERSION LOGIC
1038
SIGNALING MESSAGE HANDLING LOGIC
1044
MESSAGE TRANSMISSION LOGIC
1036
ALTERNATIVE COMMUNICATION NETWORK
1046
1032
BS

FIG. 4

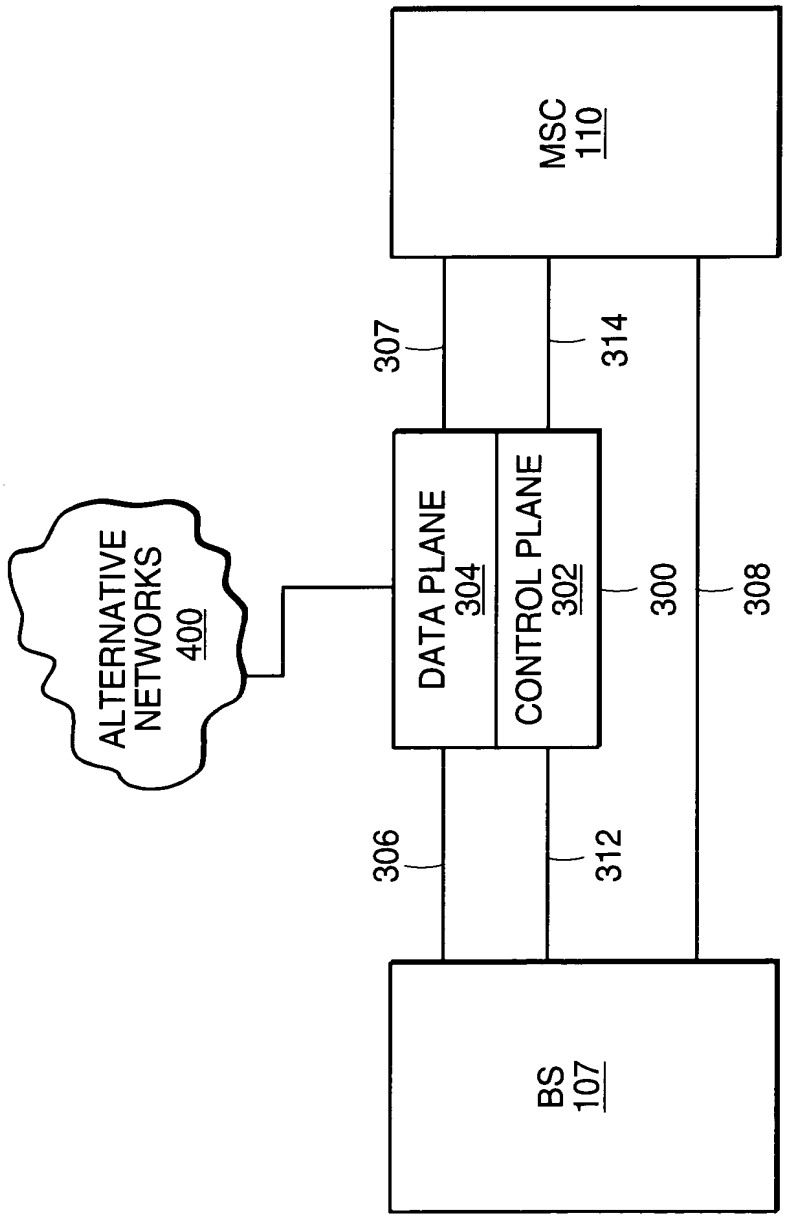
MSC
110
307
314
ALTERNATIVE
NETWORKS
400
DATA PLANE
304
CONTROL PLANE
302
300
308
306
312
BS
107

FIG. 5

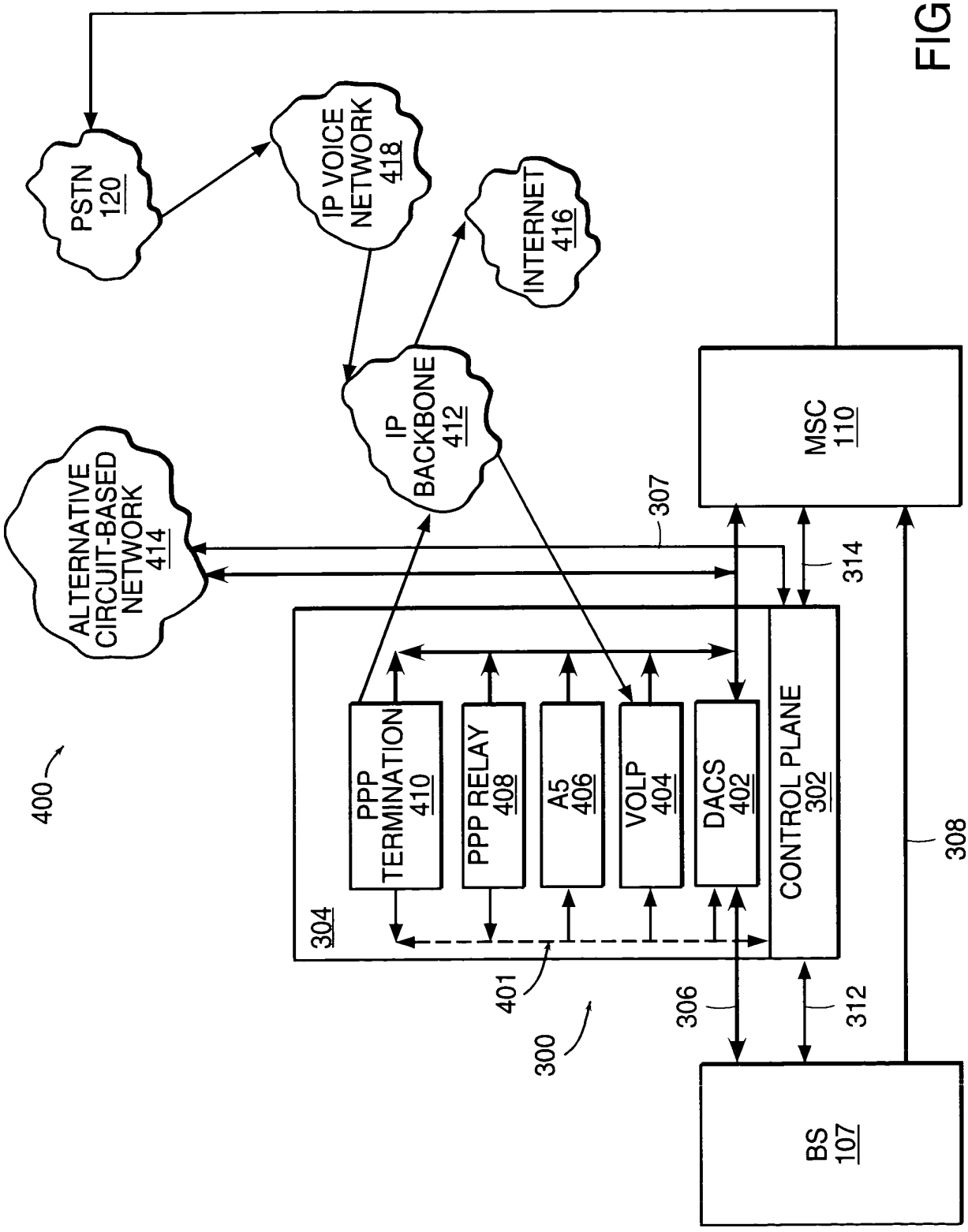
400
PSTN 120
IP VOICE NETWORK 418
INTERNET 416
IP BACKBONE 412
ALTERNATIVE CIRCUIT-BASED NETWORK 414
MSC 110
307
314
304
PPP TERMINATION 410
PPP RELAY 408
A5 406
VOLP 404
DACS 402
CONTROL PLANE 302
308
401
300
306
312
BS 107

FIG. 6

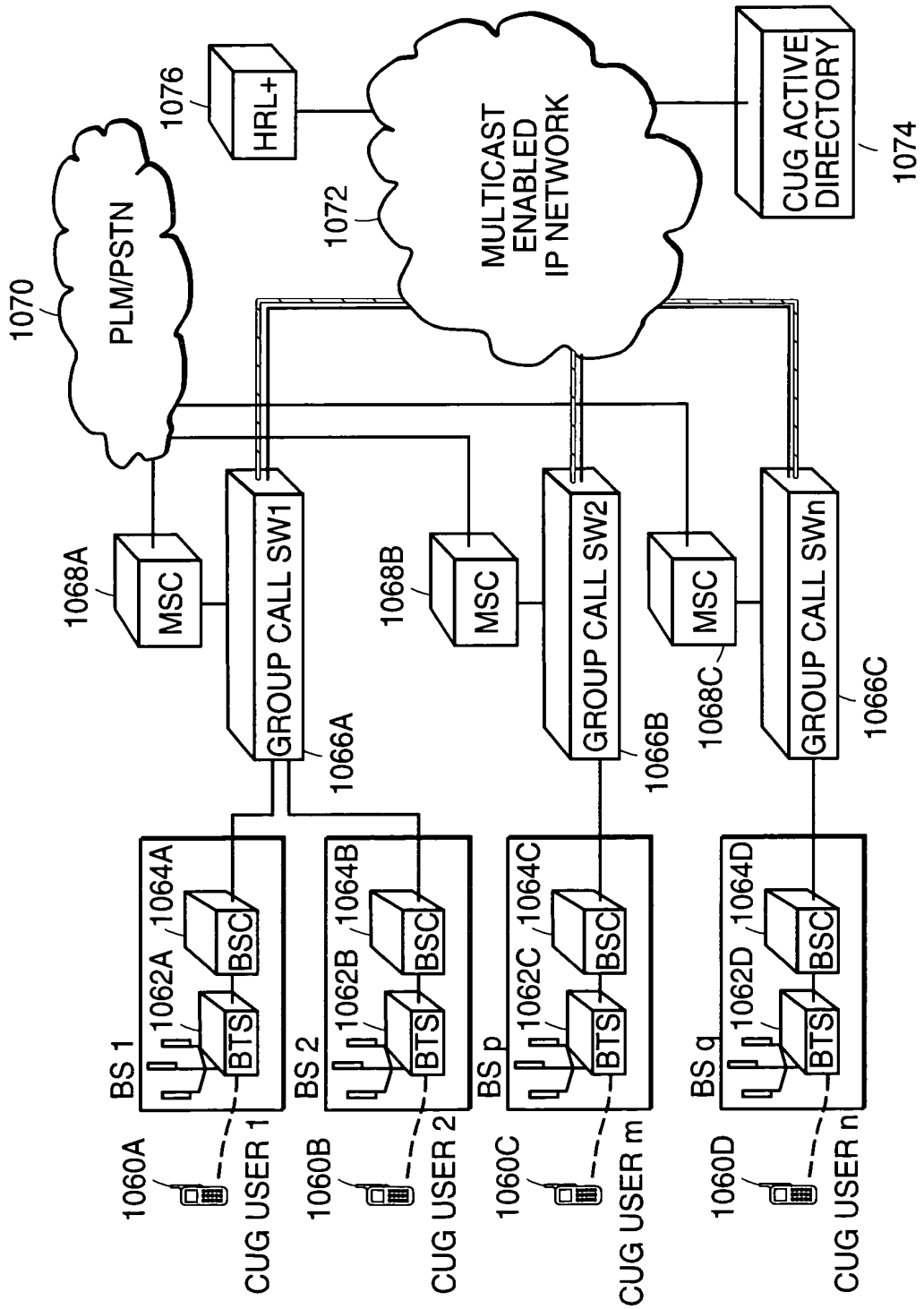
1070
PLM/PSTN
1076
HRL+
1072
MULTICAST ENABLED IP NETWORK
CUG ACTIVE DIRECTORY
1074
1068A
MSC
GROUP CALL SW1
1066A
1068B
MSC
GROUP CALL SW2
1066B
1068C
MSC
GROUP CALL SWn
1066C
BS 1
1062A
1064A
BSC
BTS
BS 2
1062B
1064B
BSC
BTS
BS p
1062C
1064C
BSC
BTS
BS q
1062D
1064D
BSC
BTS
1060A
CUG USER 1
1060B
CUG USER 2
1060C
CUG USER m
1060D
CUG USER n

FIG. 7

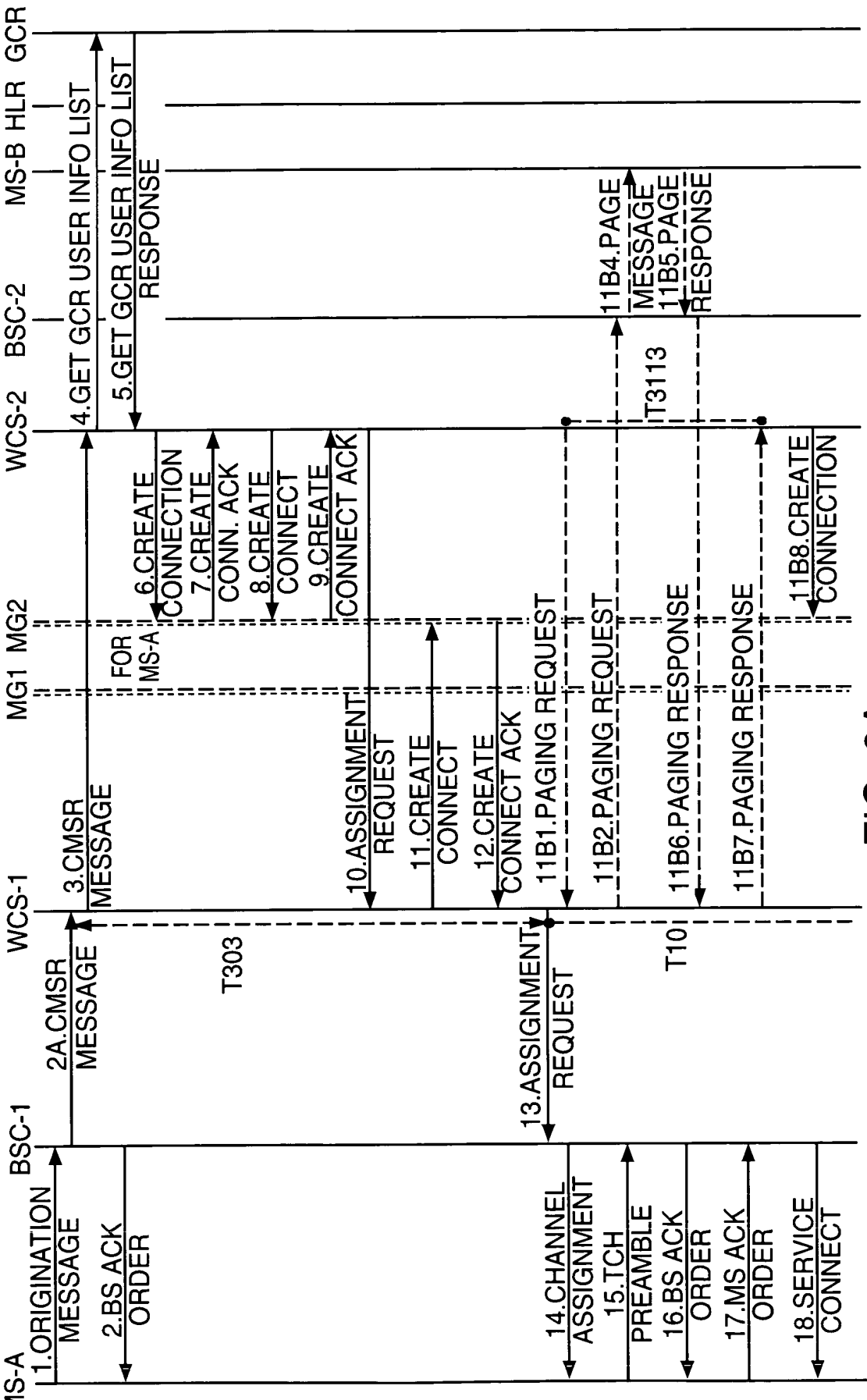
MS-A
BSC-1
WCS-1
MG1
MG2
WCS-2
BSC-2
MS-B HLR
GCR
1.ORIGINATION MESSAGE
2.BS ACK ORDER
2A.CMSR MESSAGE
3.CMSR MESSAGE
4.GET GCR USER INFO LIST
5.GET GCR USER INFO LIST RESPONSE
FOR MS-A
6.CREATE CONNECTION
7.CREATE CONN. ACK
8.CREATE CONNECT
9.CREATE CONNECT ACK
10.ASSIGNMENT REQUEST
11.CREATE CONNECT
12.CREATE CONNECT ACK
11B1.PAGING REQUEST
11B2.PAGING REQUEST
11B4.PAGE MESSAGE
11B5.PAGE RESPONSE
11B6.PAGING RESPONSE
11B7.PAGING RESPONSE
11B8.CREATE CONNECTION
T303
T10
T3113
13.ASSIGNMENT REQUEST
14.CHANNEL ASSIGNMENT
15.TCH PREAMBLE
16.BS ACK ORDER
17.MS ACK ORDER
18.SERVICE CONNECT

FIG. 8A

TO6200 "US5490

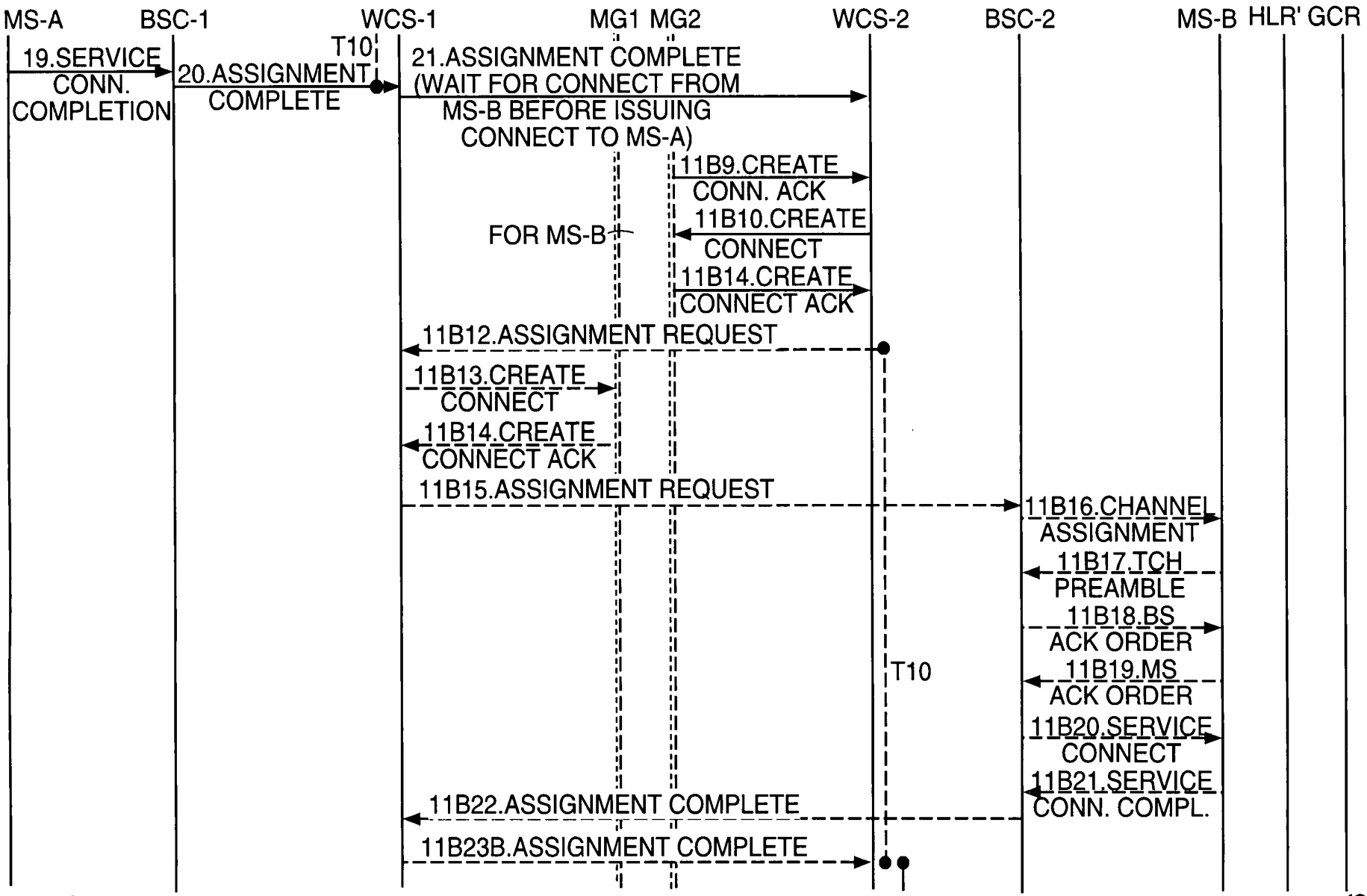

FIG. 8B

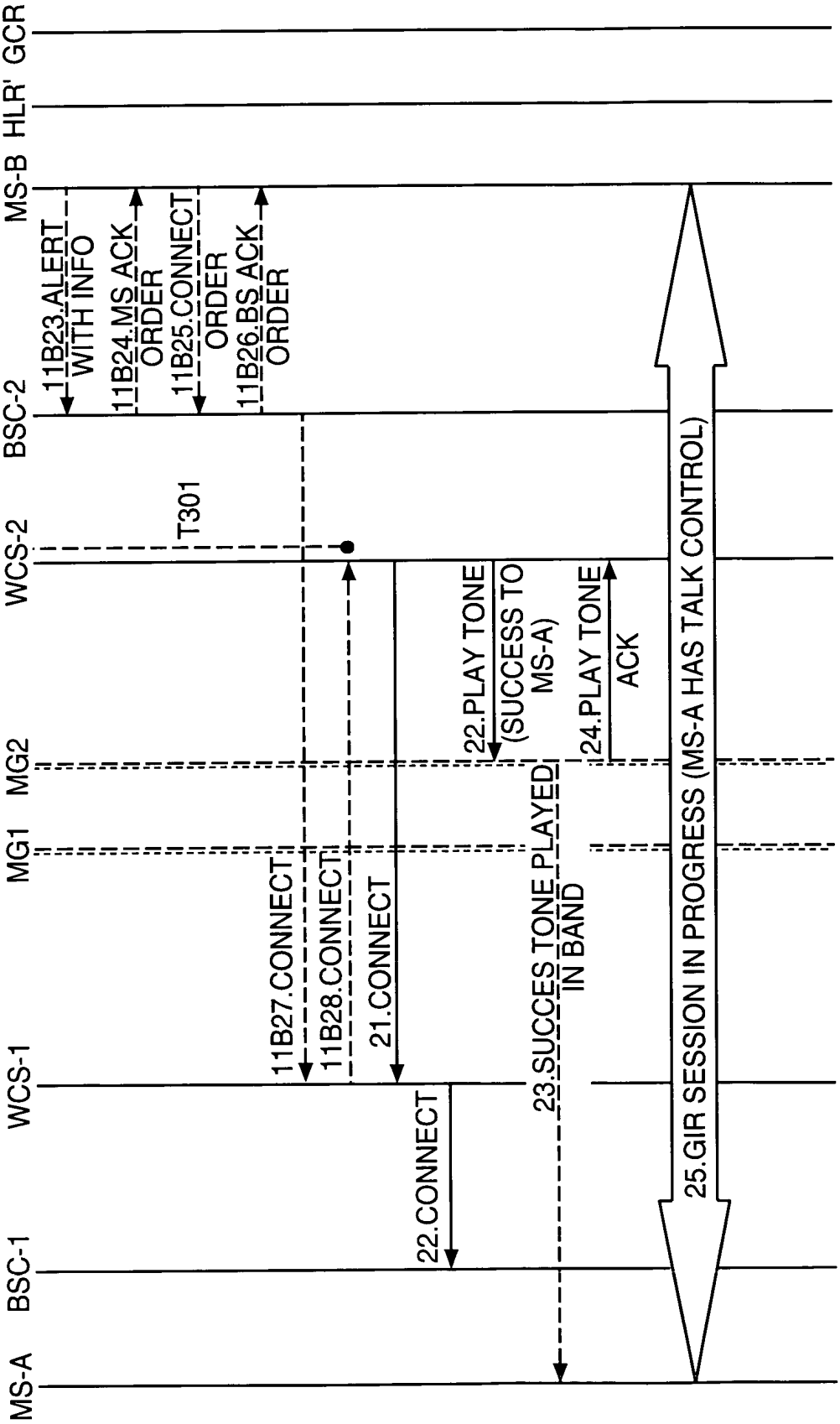
MS-A
BSC-1
WCS-1
MG1
MG2
WCS-2
BSC-2
MS-B
HLR'
GCR
11B23.ALERT WITH INFO
11B24.MS ACK ORDER
11B25.CONNECT ORDER
11B26.BS ACK ORDER
T301
11B27.CONNECT
11B28.CONNECT
21.CONNECT
22.CONNECT
22.PLAY TONE (SUCCESS TO MS-A)
23.SUCCES TONE PLAYED IN BAND
24.PLAY TONE ACK
25.GIR SESSION IN PROGRESS (MS-A HAS TALK CONTROL)

FIG. 8C

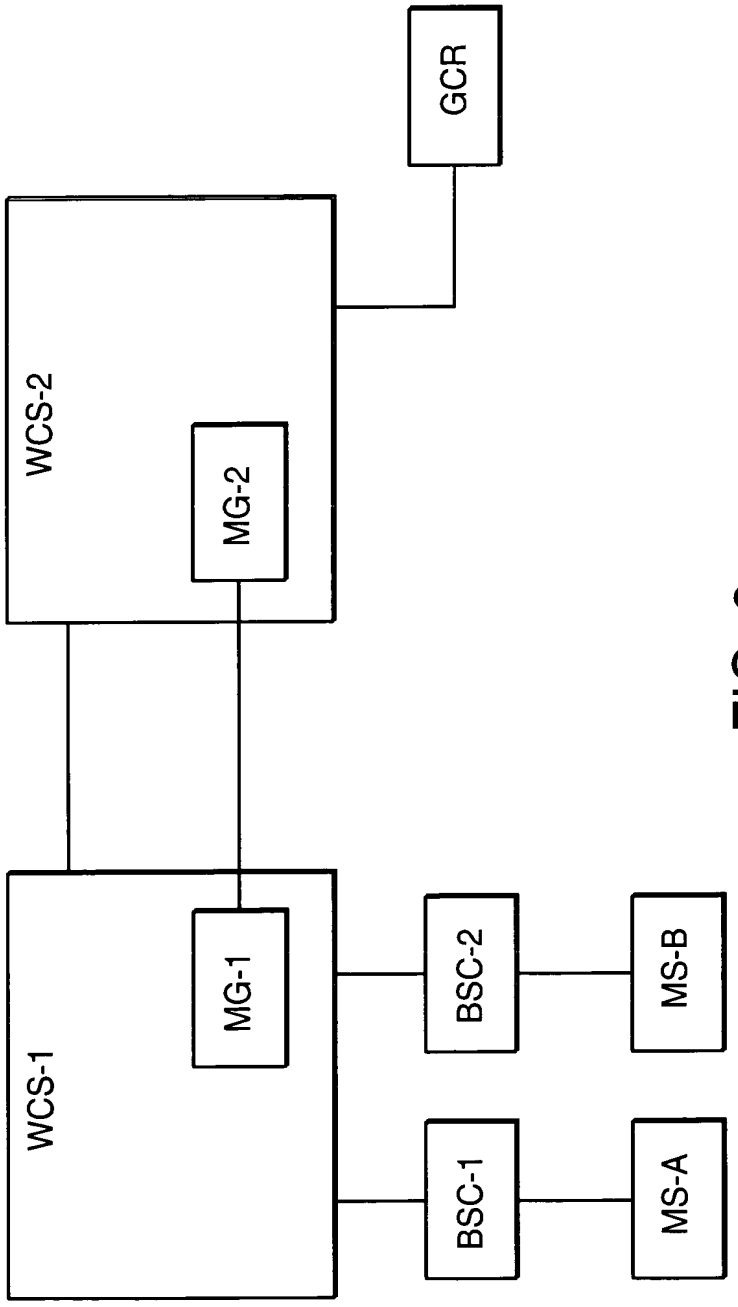

FIG. 9

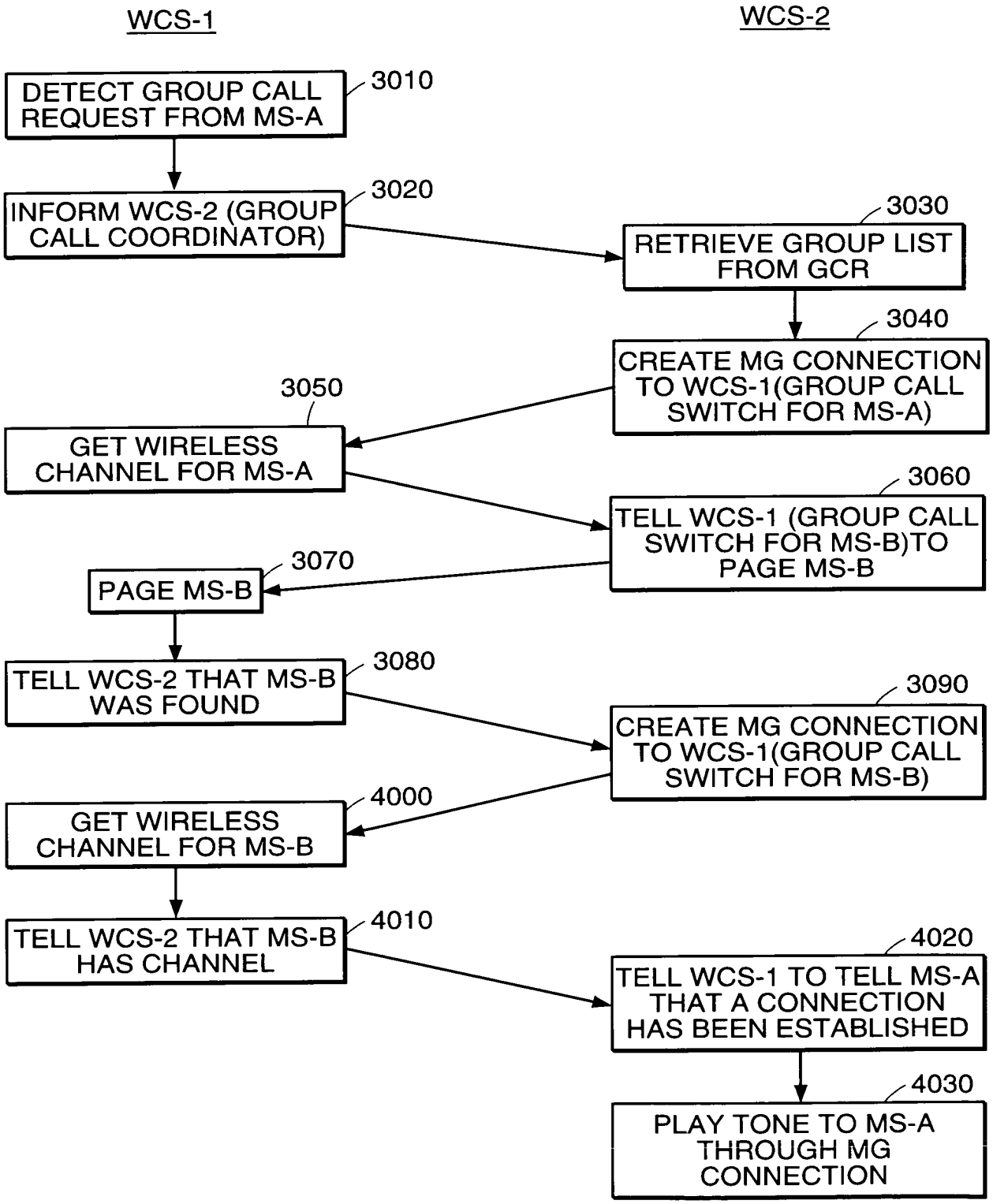
WCS-1
WCS-2
DETECT GROUP CALL REQUEST FROM MS-A
3010
INFORM WCS-2 (GROUP CALL COORDINATOR)
3020
RETRIEVE GROUP LIST FROM GCR
3030
CREATE MG CONNECTION TO WCS-1(GROUP CALL SWITCH FOR MS-A)
3040
GET WIRELESS CHANNEL FOR MS-A
3050
TELL WCS-1 (GROUP CALL SWITCH FOR MS-B)TO PAGE MS-B
3060
PAGE MS-B
3070
TELL WCS-2 THAT MS-B WAS FOUND
3080
CREATE MG CONNECTION TO WCS-1(GROUP CALL SWITCH FOR MS-B)
3090
GET WIRELESS CHANNEL FOR MS-B
4000
TELL WCS-2 THAT MS-B HAS CHANNEL
4010
TELL WCS-1 TO TELL MS-A THAT A CONNECTION HAS BEEN ESTABLISHED
4020
PLAY TONE TO MS-A THROUGH MG CONNECTION
4030

FIG. 10

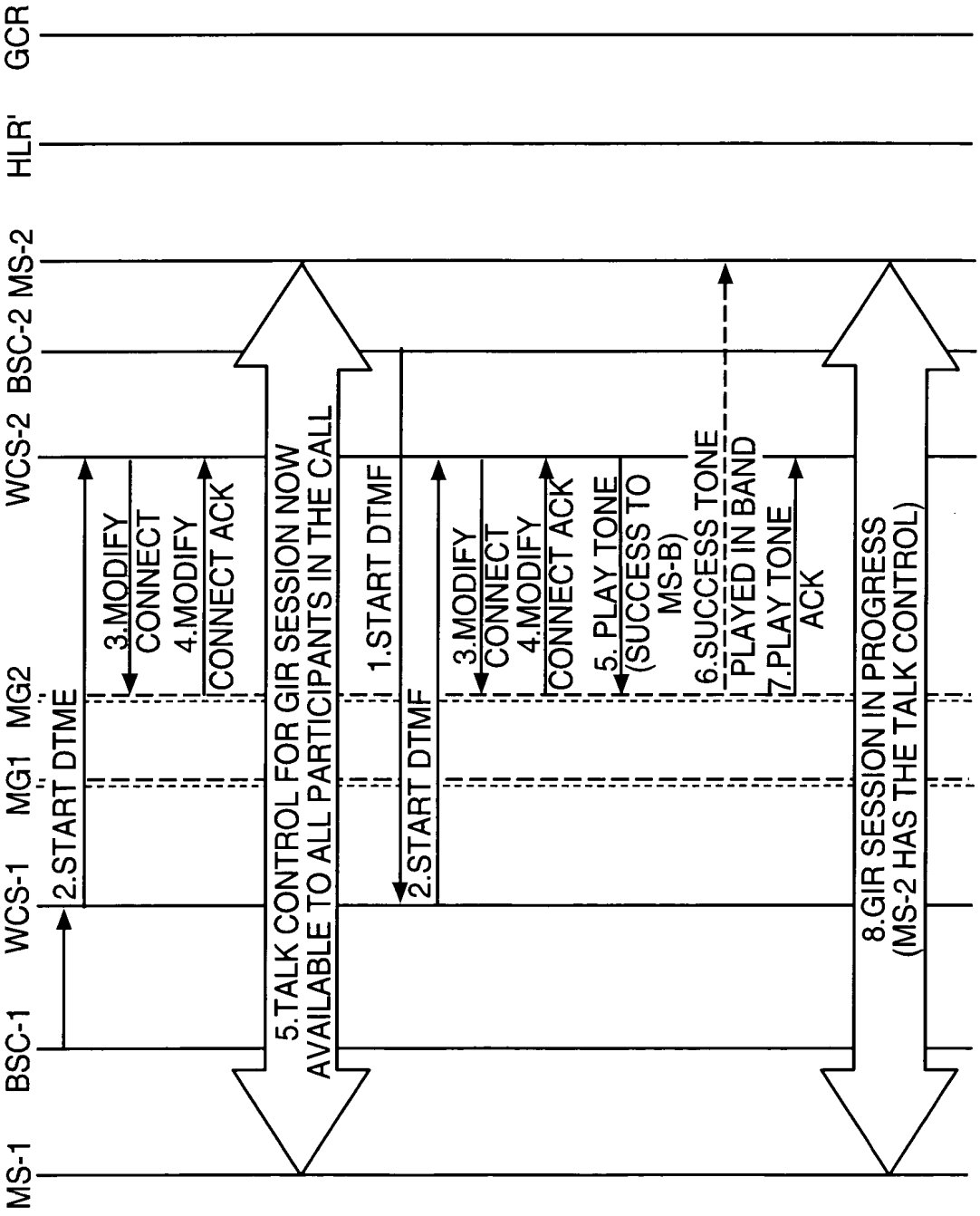
MS-1
BSC-1
WCS-1
MG1
MG2
WCS-2
BSC-2
MS-2
HLR'
GCR
2.START DTME
3.MODIFY
CONNECT
4.MODIFY
CONNECT ACK
5.TALK CONTROL FOR GIR SESSION NOW
AVAILABLE TO ALL PARTICIPANTS IN THE CALL
1.START DTMF
2.START DTMF
3.MODIFY
CONNECT
4.MODIFY
CONNECT ACK
5. PLAY TONE
(SUCCESS TO
MS-B)
6.SUCCESS TONE
PLAYED IN BAND
7.PLAY TONE
ACK
8.GIR SESSION IN PROGRESS
(MS-2 HAS THE TALK CONTROL)

FIG. 11

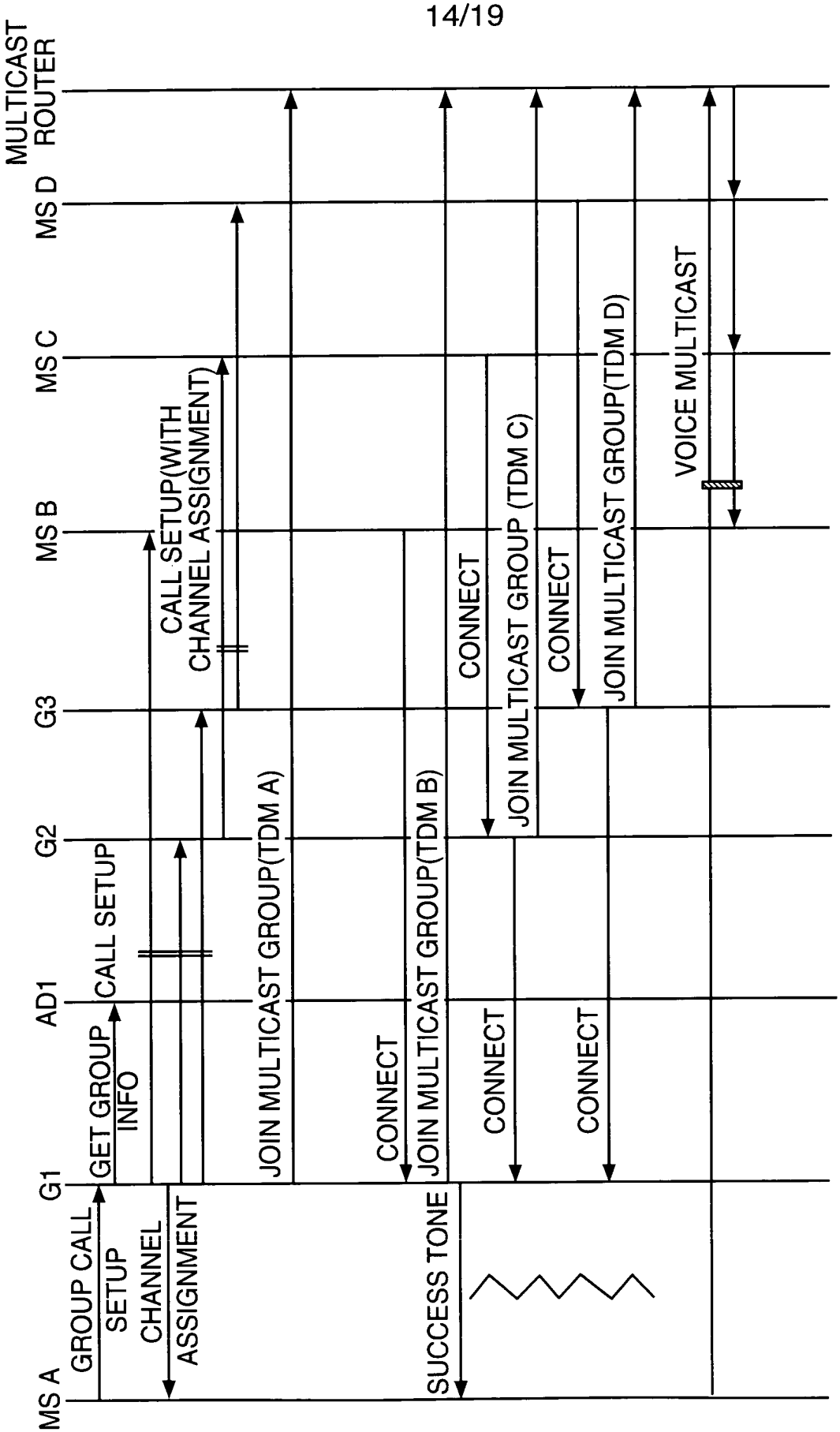
MS A
G1
AD1
G2
G3
MS B
MS C
MS D
MULTICAST ROUTER
GROUP CALL
SETUP
CHANNEL
ASSIGNMENT
GET GROUP INFO
CALL SETUP
CALL SETUP(WITH CHANNEL ASSIGNMENT)
JOIN MULTICAST GROUP(TDM A)
CONNECT
JOIN MULTICAST GROUP(TDM B)
CONNECT
JOIN MULTICAST GROUP (TDM C)
CONNECT
JOIN MULTICAST GROUP(TDM D)
VOICE MULTICAST
SUCCESS TONE

FIG. 12

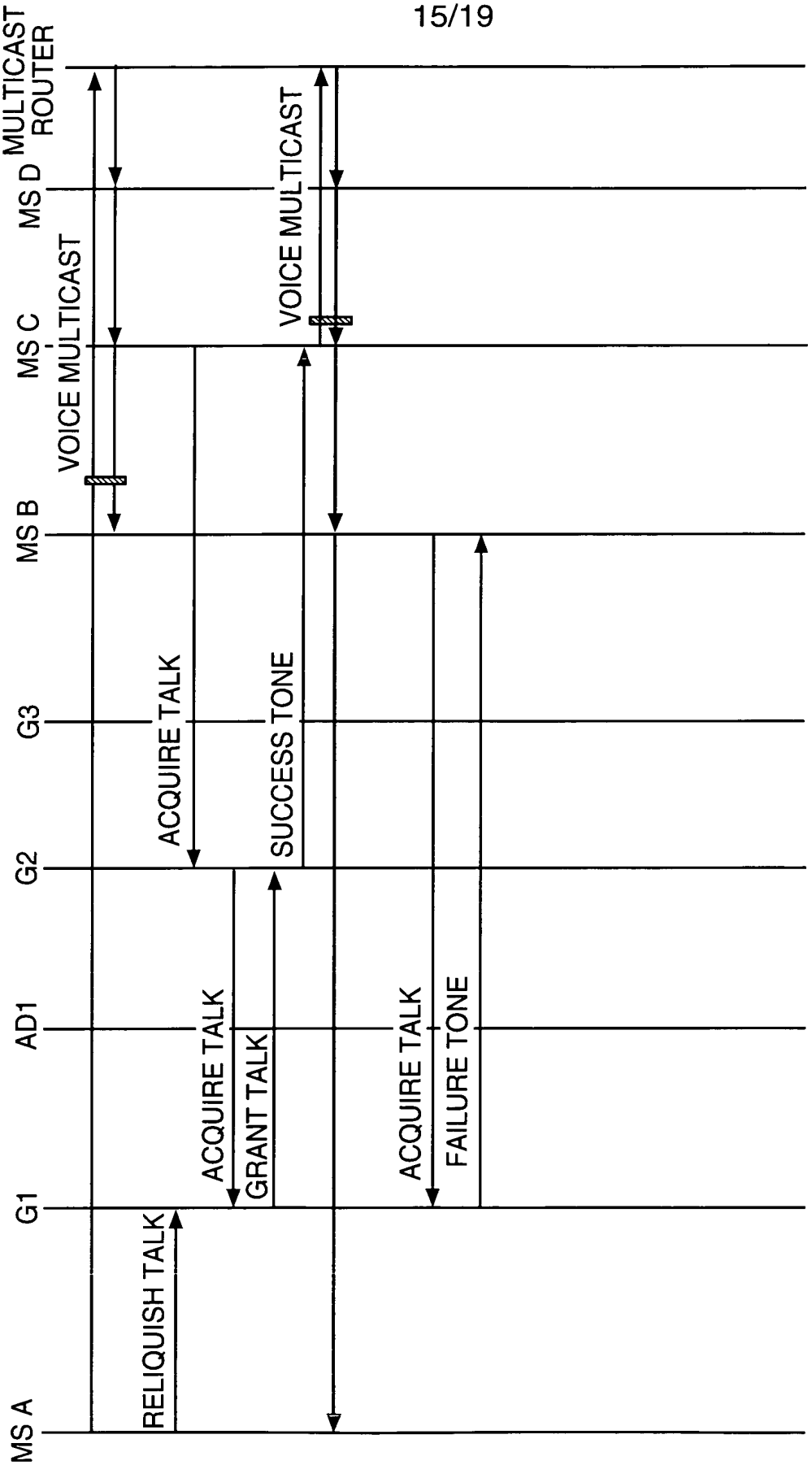
MS A
G1
AD1
G2
G3
MS B
MS C
MS D
MULTICAST ROUTER
RELIQUISH TALK
ACQUIRE TALK
GRANT TALK
ACQUIRE TALK
FAILURE TONE
ACQUIRE TALK
SUCCESS TONE
VOICE MULTICAST
VOICE MULTICAST

FIG. 13

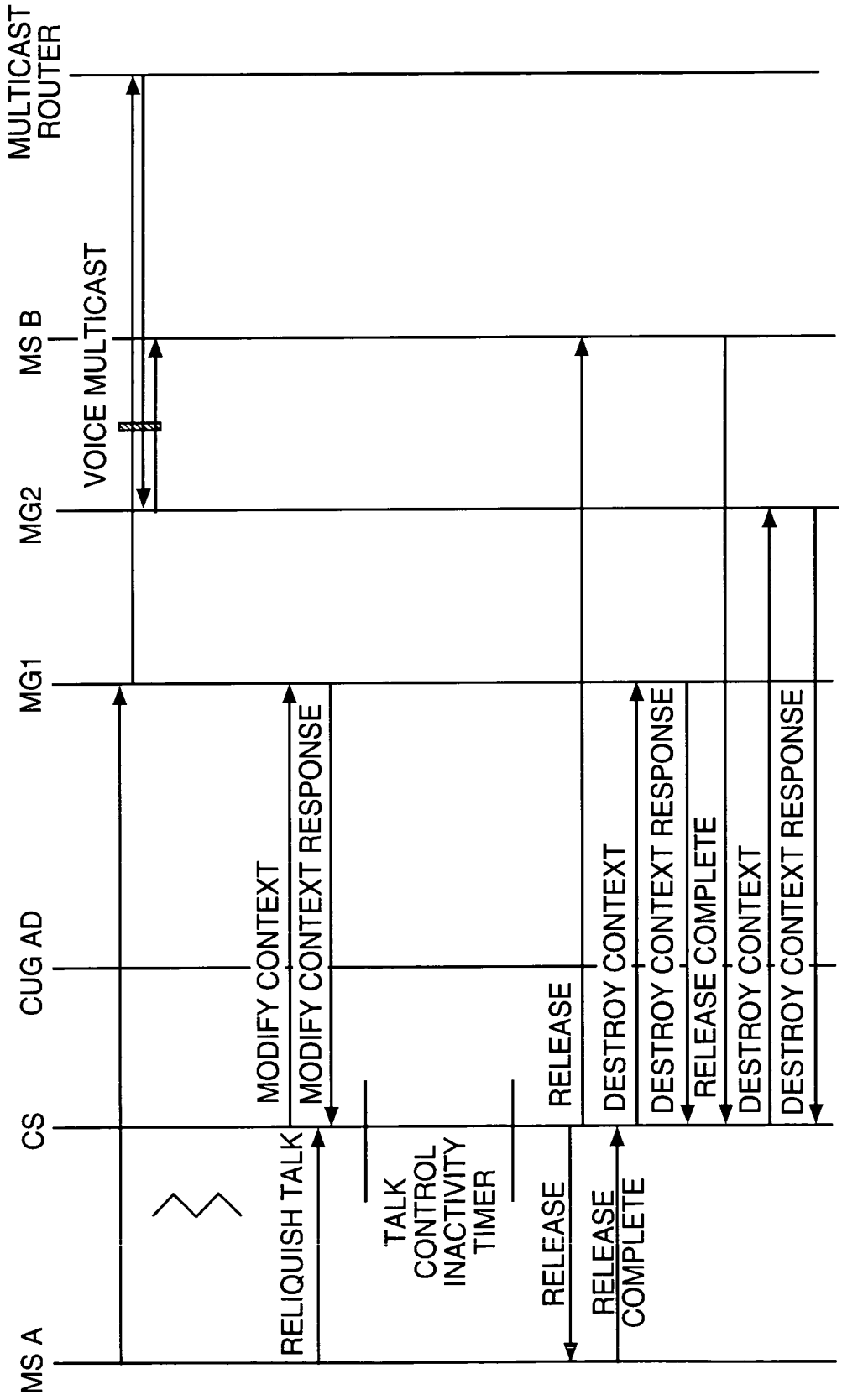
MULTICAST ROUTER
MS B
MG2
MG1
CUG AD
CS
MS A
VOICE MULTICAST
MODIFY CONTEXT
MODIFY CONTEXT RESPONSE
RELIQUISH TALK
TALK CONTROL INACTIVITY TIMER
RELEASE
RELEASE COMPLETE
DESTROY CONTEXT
DESTROY CONTEXT RESPONSE
RELEASE COMPLETE
DESTROY CONTEXT
DESTROY CONTEXT RESPONSE

FIG. 14

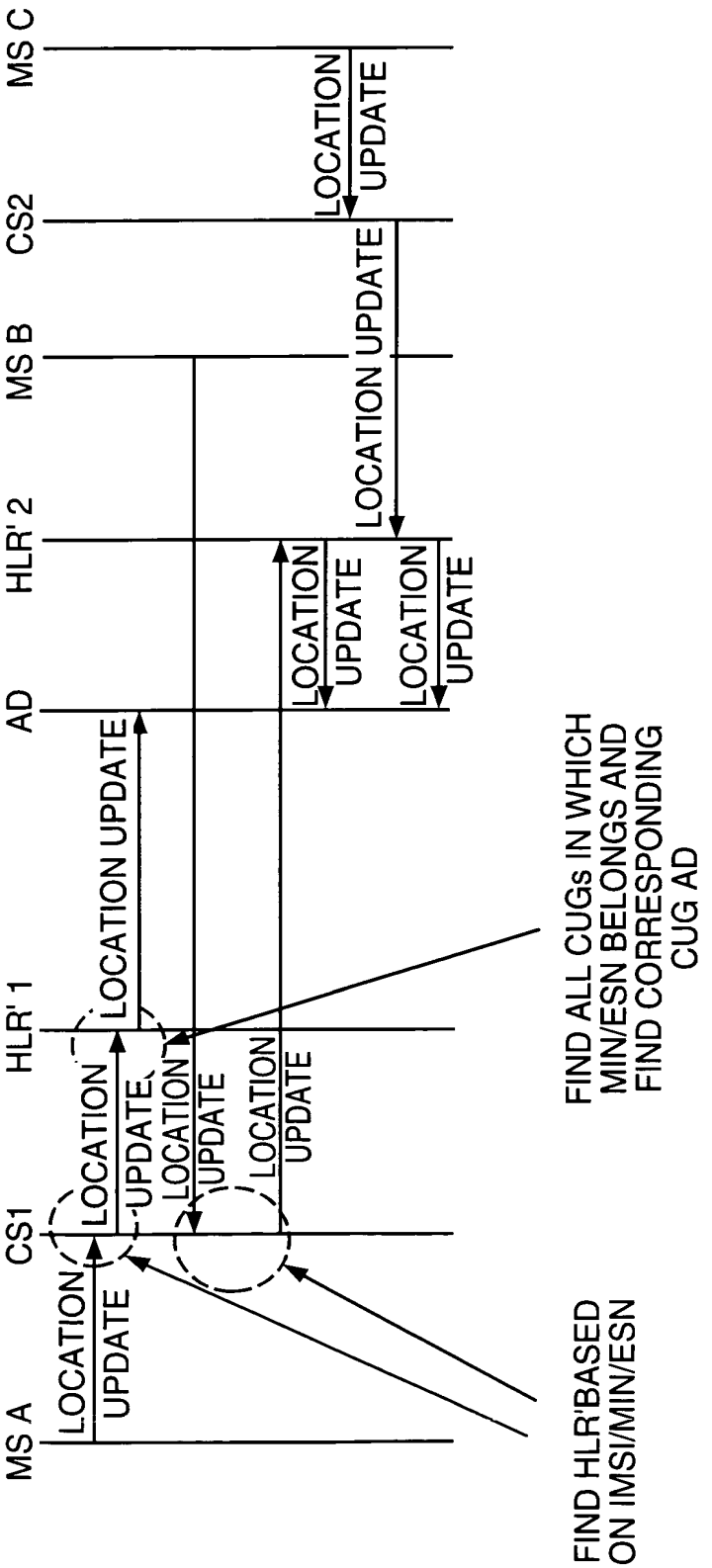
MS A
CS1
HLR' 1
AD
HLR' 2
MS B
CS2
MS C
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
LOCATION UPDATE
FIND HLR'BASED ON IMSI/MIN/ESN
FIND ALL CUGs IN WHICH MIN/ESN BELONGS AND FIND CORRESPONDING CUG AD

FIG. 15

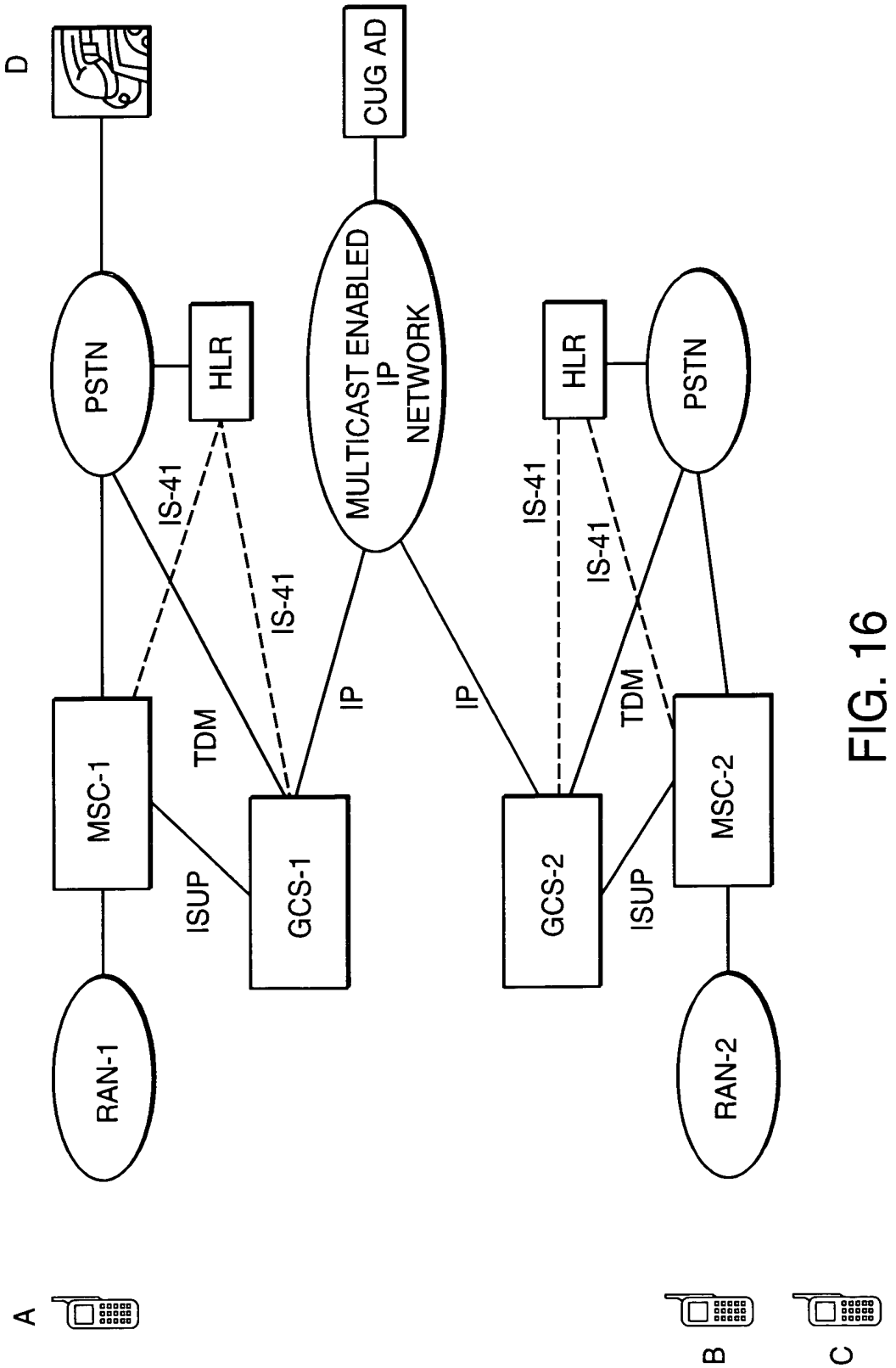
D
CUG AD
MULTICAST ENABLED IP NETWORK
PSTN
HLR
IS-41
IS-41
TDM
IP
MSC-1
ISUP
GCS-1
RAN-1
IP
IS-41
IS-41
TDM
HLR
PSTN
GCS-2
ISUP
MSC-2
RAN-2
A
B
C

FIG. 16

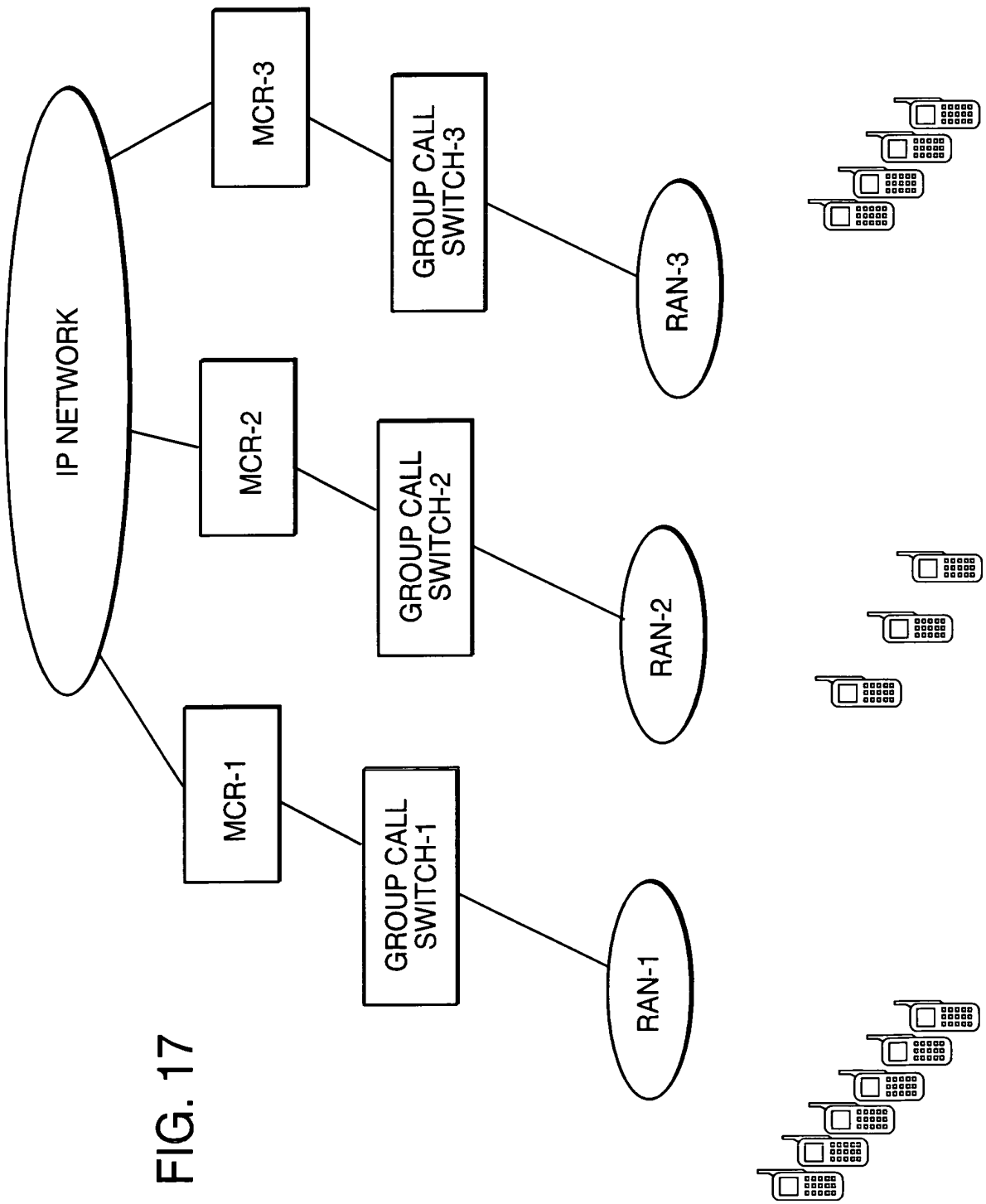
IP NETWORK
MCR-1
MCR-2
MCR-3
GROUP CALL SWITCH-1
GROUP CALL SWITCH-2
GROUP CALL SWITCH-3
RAN-1
RAN-2
RAN-3

FIG. 17